Brighton for enabling men partially disabled in the war to be trained in the craft of cutting gem-stones, and especially diamonds.

Of what in the trade are known as fancy stones, the most popular during the year under review appear to have been sapphire and emerald. Ruby still remains under a cloud, probably owing to the competition of the synthetical product. The Burmese jade, which is worked by Chinese and Japanese artificers, has been in considerable demand. Gem-stones, on account of their hardness, find a use in industry. The diamond drill is a familiar instance, but it may not be so well known that some electric motors have jewelled bearings; one factory in the United States used for that purpose no less than a ton of sapphire material.

Among the new occurrences of gem-stones referred to by Dr. Kunz may be mentioned opal, with an emerald-green to apple-green play of colour, from Hôsaka, Japan; black opal from Stuarts Range Field, South Australia; and chrysolite from Lac La Hache, British Columbia, which has been found in ten-carat stones. Dr. Kunz makes no reference to the beautiful blue zircons from India, which form one of the most interesting novelties in London jewelry of recent years; but, perhaps owing to the interruption of the ordinary trade channels, these stones had not, at least in any quantity, reached New York.

## NOTES.

ADDITIONAL interest has been given to the forthcoming commemoration of the centenary of the death of James Watt by the movement just inaugurated in Glasgow to found locally a James Watt chair of engineering at the University. Birmingham engineers decided some time ago that a similarly named chair should be installed in the University of their city, besides holding a centenary commemoration and erecting an international memorial to the three great pioneers, Watt, Boulton, and Murdock. The commemoration in Birmingham will be held on September 16–18. London, Glasgow, and Greenock, and, indeed, all parts of the country, are heartily co-operating, and, with few exceptions, the universities and scientific societies, together with many manufacturers and individual eminent men, are associating themselves with the scheme. In the Science Museum at South Kensington steps are being taken to arrange a comprehensive exhibition of Watt relics. In Birmingham the Watt relics existing there, which have so carefully been preserved by the forethought of Mr. George Tangye, and were a few years back presented to the city, will be completely re-arranged and displayed with many additions. Two pumping-engines made by Boulton and Watt will be seen; one, the first sold by the makers in 1776, will be actually shown under steam, and raising water. A memorial service will be held in the Parish Church at Handsworth, where the three contemporaries are buried. A garden-party will be held in the park at Heathfield Hall, where the garret workshop still remains as Watt left it. Lectures will be delivered by eminent men and a centenary dinner held. Some doubt seems to have been raised with regard to the claims of Birmingham to an international memorial. It should be remembered, however, that Watt's association with Boulton led to the success of his engine. Boulton's factory was famous for workmanship throughout Europe. It is true that Watt conceived his first ideas whilst working at the University in Glasgow, but he gained no practical success until he went to Birmingham. He spent the best part of his life there, including the evening of his days after he retired from business. The foundations he laid by scientific thought and careful study have resulted in the great and universal application of steam, and the appeal comes appropriately from Birmingham for an international memorial to him.

THE Wilbur Wright memorial lecture was given on June 18 at the Royal Society of Arts by Mr. Leonard Bairstow. The subject was "The Progress of Aviation in the War Period," and the lecture commenced with a *résumé* of the progress made during the last five years, and a discussion of the possibilities of the present-day aeroplane for commercial purposes. By far the most interesting part of the lecture was that dealing with stability. An account was given of the use of the accelerometer to record the acceleration of a machine during any manœuvre, and of the information which has been obtained from its readings. Only in rare cases is the acceleration such as to reduce the pilot's apparent weight to zero, and in the majority of "stunts" he is pressed into his seat by a force greater than his normal weight. Mr. Bairstow exhibited a gyroscopic model which clearly showed the nature of stable and unstable oscillations, and then showed some lantern-slides made from accelerometer records, in which these types of oscillation had been observed on actual aeroplanes. He strongly emphasised the necessity for a thorough investigation of all the problems connected with the stability of aeroplanes, and expressed a hope that, now the war is ended, systematic research will be put in hand to provide fundamental data which will enable the scientific designer to treat stability with the same degree of certainty as he is now able to compute the performance of a machine. Mr. Bairstow's opinions on this point are of great interest, as he was the first to apply the results of wind-tunnel experiments on models to the complete calculation of the stability of a machine.

AT the summer meeting of the Anatomical Society, held at the Royal College of Surgeons, London, on June 21, Major E. Distin Maddick exhibited a series of moving films which he had prepared to illustrate the application of the kinema to the teaching of anatomy. During the war Major Maddick designed and prepared many films for the use of cadets of the Royal Air Force, showing the building up and dismantling of aeroplanes and of aeroplane engines. In these films the spectator saw the various machines taken to pieces and the parts again assembled, exhibited and built up at a rate suitable to permit a demonstrator to name the various parts and explain their uses. It was this method which Major Maddick, who is a member of the College of Surgeons, has applied to the teaching of anatomy. His films show a human skeleton which turns its various aspects to the audience and then begins slowly to disintegrate until only the spinal column is left. The parts then begin to assemble, and part by part the skeleton is again built up. For large audiences desirous of becoming acquainted with the elements of human anatomy Major Maddick's films will serve a most excellent purpose, and are certain of a welcome by our soldiers in France and on the Rhine. The members of the Anatomical Society, while admiring the excellence of the technique shown by Major Maddick's films, expressed the hope that he would extend its application, particularly to the movements of limbs and joints in health as well as in disease. Such films would prove invaluable for investigators, teachers, and students.

AN International Hydrographic Conference was opened in London on June 24. The subjects to be discussed are:—(1) Charts; (2) sailing directions; (3) list of lights; (4) notice to mariners; (5) time-signals, distance-tables, and other miscellaneous hydrographic publications; (6) tide-tables; (7) instruments used for surveying on shore and at sea; (8) time-measuring instruments; (9) interchange of publications; and (10) establishment of an International Bureau. Representatives were present from Argentina, Belgium, Brazil, Chile, China, Denmark, Egypt, France, Great Britain, Greece, India, Italy, Japan, Netherlands, Norway, Peru, Portugal, Siam, Spain, Sweden, and the United States. Rear-Admiral Sir John Parry was elected president of the conference; M. Renaud, vice-president; and Mr. W. D. Barber, secretary.

PROF. F. SODDY has been elected a foreign member of the Swedish Academy of Sciences in succession to the late Sir William Crookes.

THE council of the British Scientific Instrument Research Association has appointed Mr. H. Moore to be assistant director of research.

MR. L. G. RADCLIFFE, of the Municipal College of Technology, Manchester, has been awarded the gold medal of the Worshipful Company of Dyers, London, for his researches on the sulphonation of fixed oils.

THE following acceptances of lectureships in connection with the Royal College of Physicians of London are announced:—Dr. J. L. Birley, the Goulstonian; Sir W. Leishman, the Horace Dobell; Sir J. Rose Bradford, the Lumleian; and, for 1921, Dr. J. L. Golla, the Croonian.

THE Ministry of Health for England and Wales has now been formally established by Order in Council, and the King has approved the appointment of Dr. Addison as the first Minister of Health. The functions and staff of the Local Government Board will be taken over by the Ministry.

THE annual general meeting of the Research Defence Society will be held at the rooms of the Medical Society of London, 11 Chandos Street, Cavendish Square, on Thursday, June 26, at 4.30, Lord Knutsford presiding. A short address will be given by Sir Anthony Bowlby on "Experimental Medicine and the Sick and Wounded in the War."

THERE will be an additional meeting of the Royal Astronomical Society this session, probably on July 11, to receive certain American astronomers who are on their way to Brussels to take part in the conference of the International Research Council, which will be opened there on July 18. The party is expected to include Profs. Adams, Boss, Campbell, Eichelberger, Mitchell, Schlesinger, and Stebbins.

THE last conference of the present series on "Health Work for Whitley Councils" will be held under the auspices of the Industrial Reconstruction Council on Tuesday, July 1, at 6 p.m., in the Hall of the Institute of Journalists, 2 and 4 Tudor Street, E.C.4. The chair will be taken by Sir Alexander Roger, and the opening address given by Dr. E. Halford Ross, after which will follow questions and discussion. No tickets are necessary.

THE death is announced, in his seventy-fifth year, of Dr. William Gilson Farlow, professor of cryptogamic botany at Harvard University since 1879. Dr. Farlow was president of the American Academy of Arts and Sciences in 1905. He was the author of books on "The Black Knot," "Diseases of Olive and Orange Trees," "The Gymnosporangia," "Marine Algæ of New England," "The Potato Rot," and an Index of Fungi.

A SUMMER meeting of the Royal Meteorological Society will be held at Kew Observatory, Richmond, on Wednesday, July 2. A demonstration of a portable wireless apparatus for use in the location of distant lightning flashes will be given by Mr. R. A. Watson-Watt, and the president (Sir Napier Shaw) will exhibit two diagrams showing the motion of air in travelling depressions. Pilot-balloon ascents will be made from the observatory grounds, and there will be an exhibition of autographic records of the observatory, photographs of clouds and other meteorological phenomena, and recent meteorological instruments.

THE President of the Board of Agriculture and Fisheries has appointed a Departmental Committee to arrange for the testing, adaptation, and improvement of machines likely to prove of value to agriculture, to examine inventions and new devices, and to advise as to the further steps which should be taken to promote the development of agricultural machinery. The Committee consists of the following members:—Sir Douglas Newton (chairman), Mr. G. C. Baddon, Mr. Thompson Close, Major J. G. Merrison, Capt. B. J. Owen, Mr. H. G. Richardson, Prof. R. S. Seton, and Mr. J. G. Stewart. The secretary of the Committee is Mr. V. E. Wilkins, Board of Agriculture, 72 Victoria Street, London, S.W.1, to whom all communications should be addressed.

As already announced in NATURE (February 6, 1919, p. 448), a revision of "Pritzel's Index" is in course of preparation by the Royal Horticultural Society, with the assistance of botanists attached to the Royal Botanic Gardens, Kew, the Natural History Museum, the Linnean Society, and the co-operation of the U.S. Government Plant Bureau. The estimated cost of the production of the work is 3500*l*., which may possibly be increased to 4000*l*. in consequence of the present enhanced cost of labour and materials. Up to the present contributions amounting to 968*l*. have been promised, but, being of the opinion that many more people would like to have a share in the issue of this important work, an appeal for subscriptions has just been circulated by the Royal Horticultural Society, Vincent Square, S.W.1.

THERE has been formed in America a Union of Scientific Federal Employees similar to the National Union of Scientific Workers in this country. The aims of both unions, to advance science as an essential element in the national life by improving the status of the scientific worker, are stated in terms which are nearly identical. The American union differs from the British; first, because it includes only Federal employees, and, secondly, because it is affiliated to a "Labour" organisation. The first difference already seems likely to disappear; the second indicates a difference in political conditions rather than in policy, for one of the chief arguments urged in America for affiliation was based on the cordial relations of the Labour unions to the Federal Departments. Another argument, which has also been urged over here, is that intimate relations with scientific workers will widen the outlook of the Labour unions. There is no indication at present how the American union proposes to solve the difficult problems connected with qualifications; perhaps they do not arise while membership is restricted to Federal employees. The secretary of the union is P. G. Agnew, Bureau of Standards.

Regulations have been drafted by the Society of Engineers for association with other engineering societies. The scheme admits members of such associated societies to various privileges offered by the Society of Engineers, such as attendance at meetings, visits, functions, etc., the use of the library and reading-room, and also of the appointments and employment register. The society contributes to the associated society not more than one-fifth of the annual subscription paid to the society by each member thereof who is also a member of the associated society at the date of his election. Provision is also made for the representation of associated bodies at meetings of the council of the Society of Engineers, but it is stipulated that the latter does not assume responsibility for any acts done or liabilities incurred by any associated society. It is stated that the Gloucestershire Engineering Society was the first to be associated with the scheme.

The inaugural meeting of the American Society of Mammalogists was held in the New National Museum, Washington, D.C., on April 3 and 4. Officers were elected as follows:—*President:* C. Hart Merriam, Smithsonian Institution. *Vice-Presidents:* E. W. Nelson, U.S. Biological Survey, and Wilfred H. Osgood, Field Museum of Natural History. *Recording Secretary:* H. H. Lane, University of Oklahoma. *Corresponding Secretary:* Hartley H. T. Jackson, U.S. Biological Survey. *Treasurer:* Walter P. Taylor, U.S. Biological Survey. With the intention of aiding research and of centralising ideas and energy, committees were appointed on the life-histories of mammals, the study of game mammals, anatomy and phylogeny, and bibliography. The policy of the society will be to devote itself to the study of mammals in a broad way, including life-histories, habits, relations to plants and animals, evolution, palæontology, anatomy, and other phases. The publication of the *Journal of Mammalogy*, in which popular as well as technical matter will be presented, will begin this year. Membership in the society is not confined to Americans, but any person interested in mammals is invited to join. Application for membership may be sent to Mr. Hartley H. T. Jackson, U.S. Department of Agriculture, Washington, D.C.

The drought which has been so severely felt over the southern portion of England came to an end on June 20, when there was an inch of rain over the metropolitan area due to the passage of a secondary disturbance. In many parts of the country, especially in the north and west, there was a break in the drought on June 12 due to the passage of a well-developed cyclonic disturbance across the country. Over London generally the weather was absolutely rainless for 25 days from May 10 to June 3 inclusive, and for Kew Observatory the Daily Weather Report gives no measurable rain for 32 days from May 3 to June 3. For a period of 48 days from May 3 to June 19 the total rainfall at Kew was only 0·08 in.; a partial drought, more than 28 days the aggregate rainfall of which does not exceed 0·01 in. per diem, continued for 51 days, from April 30 to June 19, the total rain measurement being 0·43 in. At Greenwich the drought lasted only 15 days, from May 10–24; whilst at Portland the drought continued for 32 days from May 18 to June 18. At Dungeness, for a period of 46 days from May 4 to June 19, the rainfall was only 0·14 in., whilst a partial drought continued for 50 days from May 4 to June 22, and was continuing at the time of our going to press. The rainfall for the seven weeks, May 1 to June 18, varied much in different parts of the country. At Stornoway the measurement was 5·50 in., at Glasgow 4·75 in., and at Birr Castle, Ireland, 5·65 in. At the English stations the Meteorological Office returns show that the rainfall was very much less. The amounts were:—Liverpool, 1·82 in.; Nottingham, 1·63 in.; Yarmouth, 1·32 in.; Jersey, 0·85 in.; Portland, 0·64 in.; and Dungeness, 0·34 in.; whilst for the London area the Rainfall Organisation at Camden Square had 0·48 in., Greenwich Observatory 0·45 in., and Kew Observatory 0·19 in. The absolute drought was severe and prolonged, but the partial drought was of comparatively short duration compared with others in the spring of former years.

The Government of the Punjab has recently announced that three great irrigation schemes, each costing 1000 lakhs of rupees, are now under consideration. They are expected to yield a financial return of from 6 to 8 per cent. on the capital expenditure. These projects are: A canal starting from the Indus at Kalabagh to irrigate 5,000,000 acres, or 8000 square miles, of wilderness lying between the Indus, Jhelum, and Chinab rivers; the Bhakra reservoir dam, 350 ft. high, to be built across the Sutlej at the debouchure from the Himalayas in order to store up 110,000 cubic ft. of water for purposes of irrigation during the winter; and the Sutlej valley project of canals from the Sutlej near Ferozepore for irrigation chiefly of the territories of Bikaner and Bahawalpur.

The Moriori, who inhabited the Chatham Islands, and are now practically extinct, have excited an interest comparable in kind, though not in degree, with that aroused by the extinct Tasmanians. They have until quite recently been regarded as a branch of the Maori people driven to the Chathams many generations ago by tribal war. But this view has been challenged on linguistic and other grounds, among which are differences between the Maori and Moriori vessels. The latter are carefully described by Mr. H. D. Skinner in the May issue of *Man*. Mr. Skinner's conclusion is that "the Moriori Waka-rimu may very well have combined elements derived from raft and canoe, a development necessitated by the absence at Chatham Islands of any timber from which a dug-out canoe could be made. . . . The use of rowing, as opposed to paddling, for the propulsion of canoes has been recorded amongst the Maoris on the west coast of the South Island, while an oar of the Moriori type was found many years ago in a cave at the head-waters of the Taieri in Otago, and is now in the Otago University Museum."

The *Veterinary Review* for May (vol. iii., No. 2) contains a valuable bibliography on contagious abortion of cattle. It starts from the year 1895, and contains 225 references. The remainder of the issue is occupied with abstracts, bibliography on current literature of veterinary subjects, and book reviews.

Capt. Major Greenwood discusses problems of industrial organisation in a paper published in the March issue of the Journal of the Royal Statistical Society (vol. lxxxii., part ii.). The advantage in respect of retention of workers of the factory with a welfare system appears to be considerable. As regards the influence of the type of work, the younger women doing heavy work do not seem to fall away faster than those of a similar age doing light work, but with women above twenty-two years of age there is a decided difference. Contrasting day-workers and continuous night-workers, the percentage inferiority in output of the night-workers amounted to 17±4·1 in winter and 12±3 in summer. As regards hours of labour and output, a reduction of 8½ hours per week (from 68·2 hours to 59·7 hours) increased the gross output by 8 per cent.

FROM an analysis of more than half a million admissions to sick report of troops in camps in the United States, of whom 531,445 were white and 15,186 coloured, Lt.-Col. A. G. Love and Major C. B. Davenport form a comparison of white and coloured troops in respect to incidence of disease. As regards total relative frequency of disease in the two races, the coloured troops were about 19 per cent. more liable to go on sick report than the white troops. The coloured troops were relatively less resistant to diseases of the lungs and pleura as well as to certain general diseases, like tuberculosis and smallpox; they are also much more frequently infected with venereal diseases. But the uninfected negro is highly resistant to diseases of the skin, mouth, and throat; he seems to have more stable nerves, has better eyes, and metabolises better (Proc. National Acad. Sciences, vol. v., p. 58, 1919).

DR. H. H. LAUGHLIN has made a cytological and statistical study (Carnegie Inst. Washington, Publication No 265, pp. 48+18 tables) of the relative and absolute durations of the several arbitrarily delimited progress-stages in cell-division. His material was found in the root-tip cells of the common onion. With great carefulness Dr. Laughlin has determined the duration of ten successive stages at temperatures of 10° C., 20° C., and 30° C. The total period at these three temperatures was 292·52, 240·97, and 91·56 minutes respectively. The resting stage counts for 194·92, 159·57, and 33·26 minutes; the early prophase for 52·2550, 59·2592, and 51·4147. Thereafter the changes take place very rapidly. The velocity increase at a given temperature compared with the velocity of the same stage at 10° C. lower (what is known as the $Q_{10}$ value) approximates to the expectations deducible from van't Hoff's law. That is to say, the mitosis behaves in its velocity increments to temperature-increments like the simpler chemical reactions. But this does not mean that mitosis is "a simple chemical reaction." Far from it; we have to deal with a *répertoire* of activities, a vast complex of physical and chemical activities, in which the many aberrations from the velocity-gradient of a simple chemical process are mutually cancelled. The author's study marks a distinct step of advance in the analysis of mitosis.

THE "tillite with scratched boulders in the Varanger district of Finmarken is referred by Olaf Holtedahl, of Kristiania (*Amer. Journ. Sci.*, vol. xlvii., p. 85, 1919) to a pre-Caledonian epoch, probably Ordovician. A comparison is made with the coarse conglomerates of Girvan in Ayrshire. The paper reviews the Palæozoic rocks of Finmarken, and assigns an inorganic and concretionary origin to the structures known as stromatolites, including Cryptozoön and Gymnosolen. The author cannot agree with Walcott that the limestones containing these objects were accumulated in fresh water, but he thinks that algal activities may have aided in the deposition of the calcium carbonate.

THE zoning of the "Karroo System" of South Africa, which is in reality the representative of more than one system, receives a new investigation from Mr. A. L. du Toit in the Proceedings of the Geological Society of South Africa for 1918 (p. xvii). The author carries the glacial Dwyka series down into the Upper Carboniferous, and the Ecca beds thus become Lower Permian. The Cave Sandstone at the top of the Karroo formation is regarded as an æolian deposit of probably Rhætic age, comparable with the Pleistocene löss of the northern hemisphere. The former wide extension of the overlying Drakensberg lavas, including the basalts along the Zambesi, is indicated, and these are also brought, so far as present evidence goes, within the Rhætic series.

THE Press of Aragon (Spain) has recently published a description of trials made by a Spanish engineer of straw-compound as a substitute for coal. This fuel is said to have great advantages over coal for locomotives and agricultural tractors, as it develops sufficient heat in thirty minutes to give the necessary head of steam. The U.S. Commerce Report No. 86 (1919), reporting this discovery, states that the ashes left by the fuel in question make an excellent fertiliser. Another Spaniard has patented a process for the use of banana fibre for textiles, yarns, cords, and alpargata soles as a substitute for hemp and jute. Trials have proved satisfactory, and plant is to be laid down to work the process.

THE recently issued annual report of the Decimal Association shows that the efforts of the association in favour of the compulsory introduction of decimal coinage and the metric system of weights and measures continue to make satisfactory progress. The Bill brought forward by Lord Southwark last year has aroused the interest of many public bodies, and numerous resolutions have been passed in favour of decimal coinage. The measure will remain in abeyance until the Royal Commission appointed to deal with the subject issues its report, which is expected in the early autumn. A number of local educational bodies have signified their approval of the proposal to introduce the metric system of weights and measures. British Chambers of Commerce abroad are actively supporting the proposed reform, as they regard the adoption of the metric system by this country as an essential preliminary to success in supplanting German ascendency in foreign markets. Although the use of the system has been for many years permissive in the United Kingdom, business firms adopting it suffer much inconvenience owing to the railway companies refusing to accept consignment notes made out in terms of metric weights; this difficulty will continue to hamper progress until the system is made obligatory. The *Decimal Educator*, a quarterly journal started by the association during the year, has met with a marked measure of success.

WITH reference to Irish reconstruction problems, the question of producing industrial alcohol was discussed by Dr. J. Reilly, of the Royal Naval Cordite Factory, in a lecture delivered before the Royal Dublin Society a short time ago. One of the chief points suggested for consideration was whether, by the use of alcohol as a motor-fuel, the dependence of this country upon foreign supplies of petrol could not be obviated or lessened. We import about 150,000,000 gallons of petrol yearly. To replace this by alcohol obtained from potatoes about 7,000,000 tons of the latter would be required. Allowing for rotation crops, this quantity of potatoes would require some 6,000,000 acres of land for its production. At present Ireland grows about 4,000,000 tons of potatoes per annum. She could grow more, no doubt, though how much more is not at present very clear. Assuming that the requisite amount of land could be spared after food needs were supplied, the practical test of the matter would be the price of the alcohol produced in relation to that of petrol. As to this the lecturer gives no dogmatic pronouncement; he only suggests that there is a case for consideration. In a country such as Ireland, with a large agricultural population, it is essential for prosperity that the land should be made to provide more wealth, both in the shape of food and in that of raw material for industry. It has been argued that crops with a higher starch-content can be grown more cheaply in tropical countries, and the resulting alcohol could, and would, be imported here. Against this Dr. Reilly remarks truly that it is unwise for a country to rely solely on foreign supplies.

Among forthcoming books of science we notice the following:—Vol. iii. of the English translation, by H. Spencer-Browne, of Doyen's "Surgical Therapeutics and Operative Technique" (*Baillière, Tindall, and Cox*); "The Story of the English Public Health," Sir Malcolm Morris, and "Infant and Young Child Welfare," Dr. H. Scurfield (each in the new series of English Public Health) (*Cassell and Co., Ltd.*); "The Natural History of the Child," Dr. C. Dunn (*Sampson Low and Co., Ltd.*); and a new and revised edition of "Mental Diseases," Dr. H. R. Cole (*University of London Press, Ltd.*). "The Chemical Trade Year-Book" is in preparation by *Messrs. Bandon and Morris*, of Red Lion Passage, W.C.1.

Mr. F. Edwards, 83 High Street, Marylebone, has just issued a catalogue (No. 391) of nearly 1000 items relating to the Dominions, Colonies, and Dependencies of the British Empire. It contains many scarce works, is carefully classified, and will doubtless interest many readers of Nature. Mr. Edwards has also circulated a short list (No. 390) of new books at remainder prices. Many of the volumes deal with scientific subjects. The catalogues will be sent free upon application.

The Scientific Attaché to the American Embassy informs us that the position of the solar prominence referred to in the cablegram from Dr. L. A. Bauer published last week (p. 311) was wrongly recorded. A further message states that the position should have been given as *south*-south-west instead of *west*-south-west.

## OUR ASTRONOMICAL COLUMN.

The Planets.—The three bright planets which have been so conspicuous during the last few months are now leaving the evening sky. Jupiter will be in conjunction with the sun on July 21, Saturn on August 25, whilst Venus, which will be at greatest elongation 45° E. on July 5, is approaching greatest brilliancy (August 8), and will be at inferior conjunction on September 13. Mars is coming into view as a morning star rising in the N.E.

On the evening of July 2, at 9h. G.M.T., a very close and interesting approach of Venus and Saturn may be observed in the W.N.W. sky. The two objects will be separated by an apparent distance of 10′ of arc. Venus will set at about 10.30 G.M.T., and will be a brilliant object, offering a strong contrast to the feeble appearance of Saturn in the strong twilight. It will be interesting to examine the two planets in the same field of view with a good telescope, and to note the great difference in colour and brilliancy to the unaided eye. This conjunction will form one of the most attractive planetary configurations of 1919. It is true that the conjunction of Venus and Saturn is not a rare event, although one of the same character as that to which we are now referring is very seldom observed, since it will take place at a very convenient time for observation and the objects will be unusually near each other. On a few evenings preceding and following July 2 the changes in the relative places of Venus and Saturn will be considerable, and it will be entertaining to trace them from night to night.

Admiralty Tide-tables.—A sentence in the Astronomer Royal's report, noticed in last week's Nature, may have given rise to misconception. The day used in the Admiralty tide-tables for the current year and previously begins at midnight, and is divided into two periods of twelve hours, a.m. and p.m. respectively. The change to be introduced into the issue of the tables for 1920 is that the hours will be numbered from 0 to 23.

## THE NATIONAL PHYSICAL LABORATORY.

The annual visitation and inspection of the National Physical Laboratory by the General Board took place on Tuesday, June 24. The numerous visitors invited by the Board made a tour of the laboratory, and were given an opportunity of seeing in operation various subjects of interest which are at present being investigated at the laboratory.

The engineering department exhibited an apparatus for the determination of the absolute viscosities of liquids at high pressures. The liquid under test is arranged to flow through a capillary under a constant-pressure difference, and its velocity calculated from the indications of the instrument. The Lanchester worm-gear testing machine for obtaining the efficiency of a worm-gear was shown. The machine is so arranged that a pressure corresponding to a transmission through the box of as much as 100 h.p. can be obtained between the gear-teeth, it being necessary to supply from an external source only the losses in the gear and apparatus. In the apparatus used for the measurement of journal friction, a tilt due to a force of about 1/300th of a pound weight acting at the end of a 3-ft. lever could be measured. Variations of the coefficient of friction of the bearings due to different oils could be observed with this apparatus. Other exhibits in this department were the following:—An apparatus for testing the wear of stranded cables, an extensometer for use at high temperatures, a high-velocity impact testing machine, and a wear-testing machine.

The aeronautical department demonstrated how data for solving problems such as the following are obtained in the wind channels:—(1) The mutual interference of air-screw and body, and the flow in the neighbourhood of the air-screw; (2) the spinning of aeroplanes; (3) the balancing of rudders; and (4) the determination of the rotary derivations on SS. Zero airship. Various models of complete machines and a model of a mooring device for rigid airships were exhibited.

Demonstrations were given in the metallurgy department of the rolling of high tensile aluminium alloys. The recuperative gas furnace and the electric "ring" furnace for high-temperature work were seen in operation. A chronograph for the direct plotting of time-temperature observations in the form of "inverse-rate" curves, as required for the heating and cooling curves of metals and alloys, was demonstrated. The curve plotted by the instrument may be regarded as the differential coefficient of the simple time-temperature curve representing the observations.

Tests on seaplane-floats were carried out in the William Froude national tank. Two different types of experiment were conducted: (*a*) on resistance, running angle, and longitudinal stability of a float when planing on the water; and (*b*) on the impact of a seaplane when alighting on water, measurements of the deceleration and the blow received by the float being made.

In the large gauge-room, which was added to the metrology department during the war for the purpose of testing gauges used for munitions, were seen different types of gauges and the methods of testing them. During the busiest period of the war some